



INVESTOR MEETING 2013

November 21, Santa Clara, CA



Advancing Moore's Law: Benefits Across the Portfolio

William Holt

Executive Vice President
General Manager, Technology and Manufacturing Group

INVESTOR MEETING 2013

November 21, Santa Clara, CA



Agenda

Fundamentals of Moore's Law
Cost, Capability, Performance/Watt

Reducing Cost in a Capital
Intensive Environment

Applying the Benefits Across the
Product Portfolio



Brief Update on 14nm Status

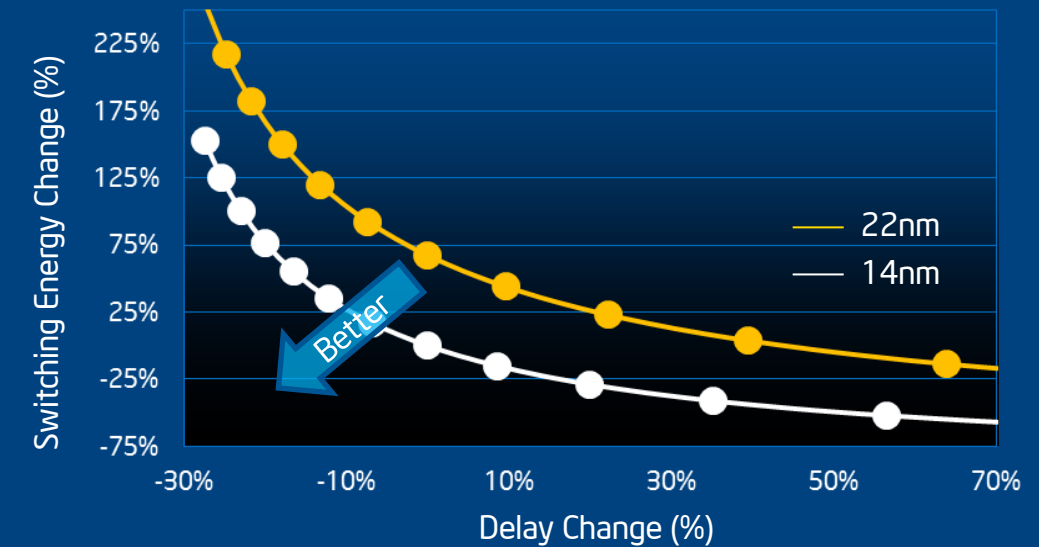
Yield

at the same point in development



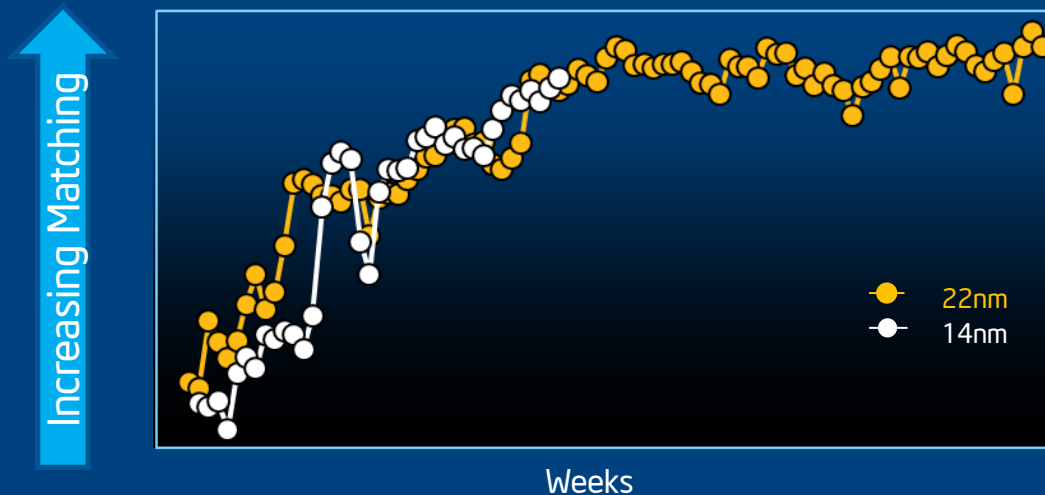
Performance Improvement

Switching Energy vs. Gate Delay



Key Parameter Matching

% of key process parameters meeting 3-sigma targets at the same point in development



14 nm key process parameter matching on track with 22 nm trend

Reliability Scorecard

at the same point in development

Module

Transistor
Interconnect
Thermo-Mechanical/Moisture
Test Vehicle Yield
ESD/LU
Alpha Particle/Soft Error

22nm
(2 year offset)

14nm

Transistor	Low risk	Low risk
Interconnect	Low risk	Low risk
Thermo-Mechanical/Moisture	Medium risk	Low risk
Test Vehicle Yield	Medium risk	Medium risk
ESD/LU	Low risk	Low risk
Alpha Particle/Soft Error	Medium risk	Low risk

Low risk
Meeting all cert goals

Medium risk
Close to meeting goals

High risk
Not yet meeting all goals, needs additional work

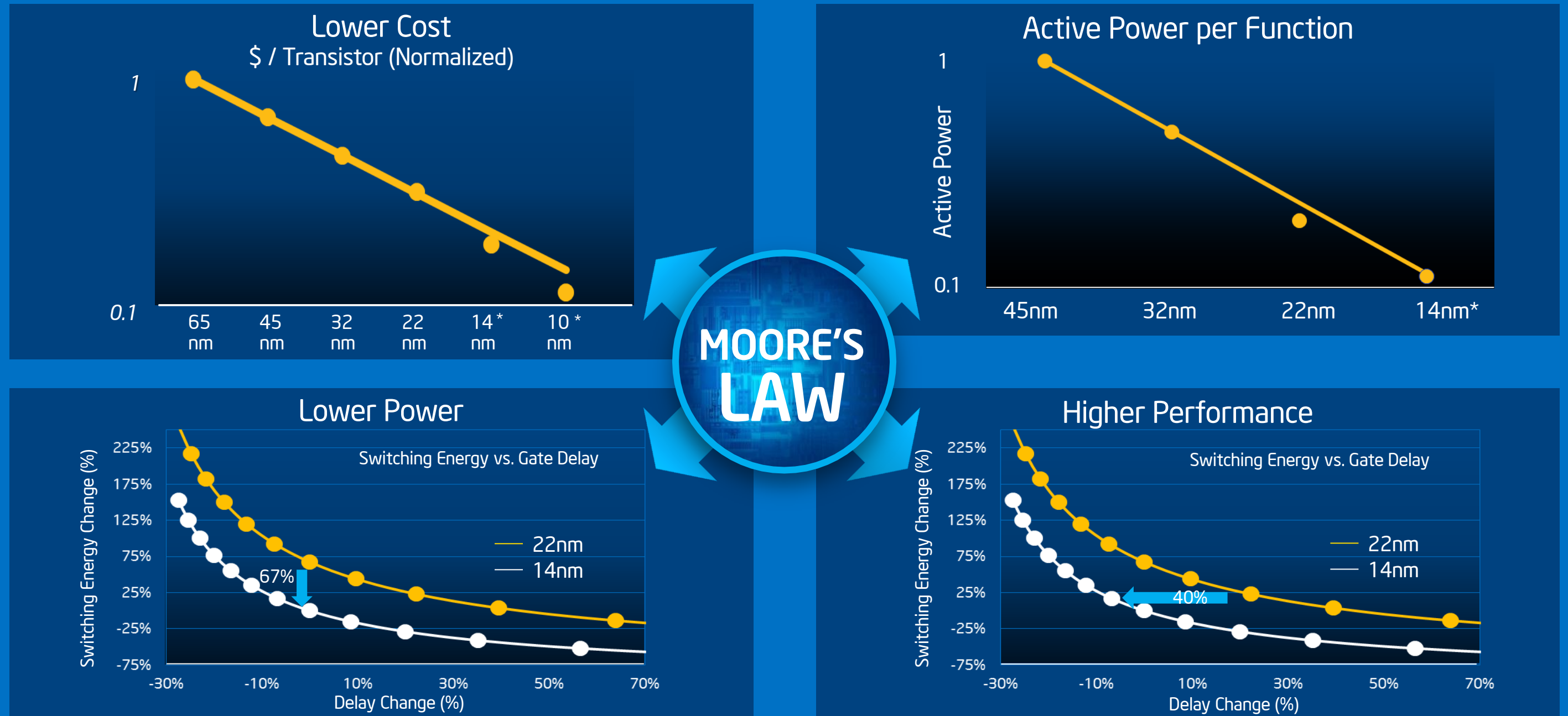
Generally healthy reliability at this stage, on track for Q1 '14 certification *

Fundamentals of Moore's Law

Reducing Cost in a Capital Intensive Environment

Applying the Benefits Across the Product Portfolio

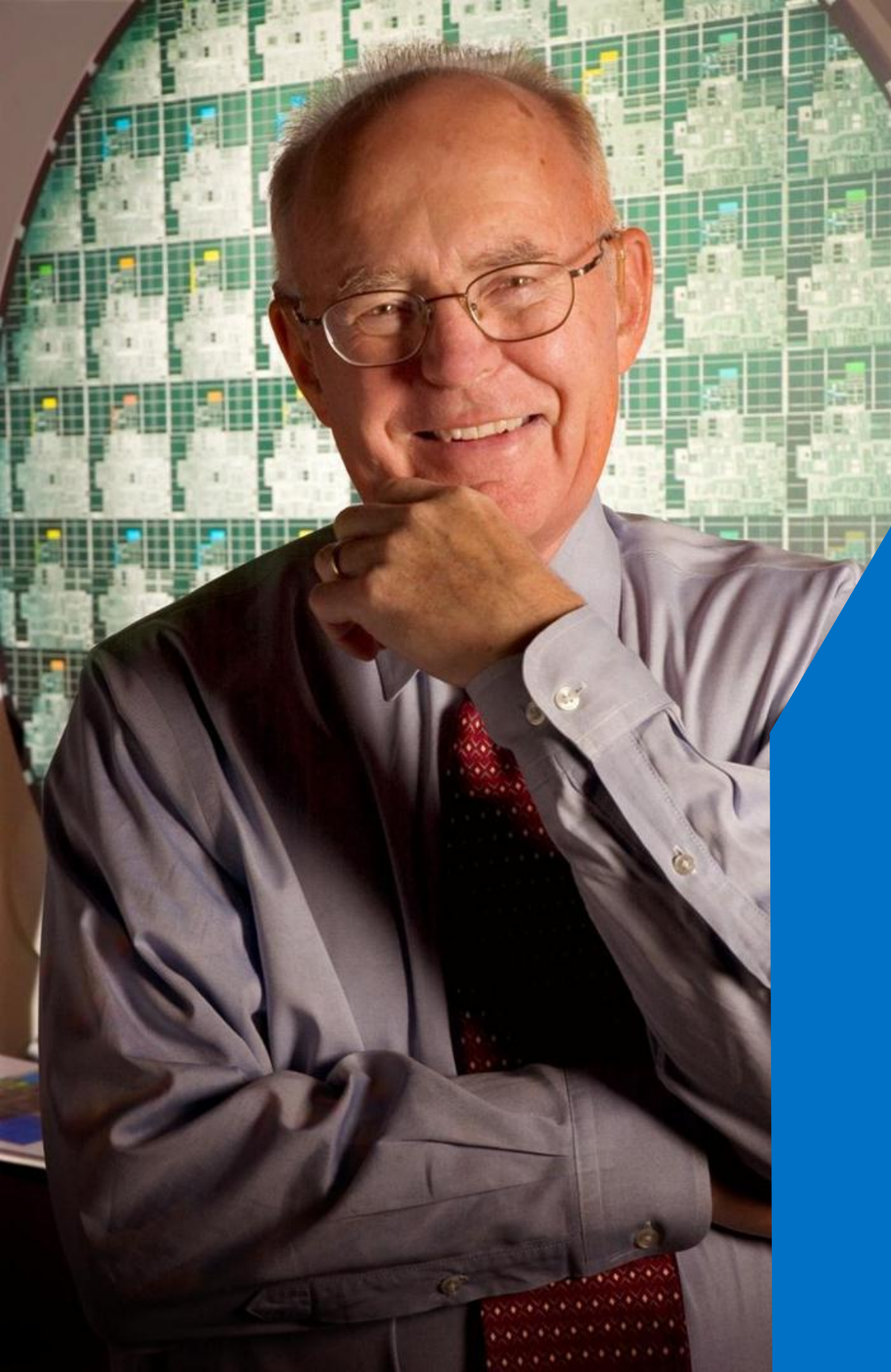
Getting Benefits of Moore's Law Across all Value Vectors



Fundamentals of Moore's Law

Reducing Cost in a Capital Intensive Environment

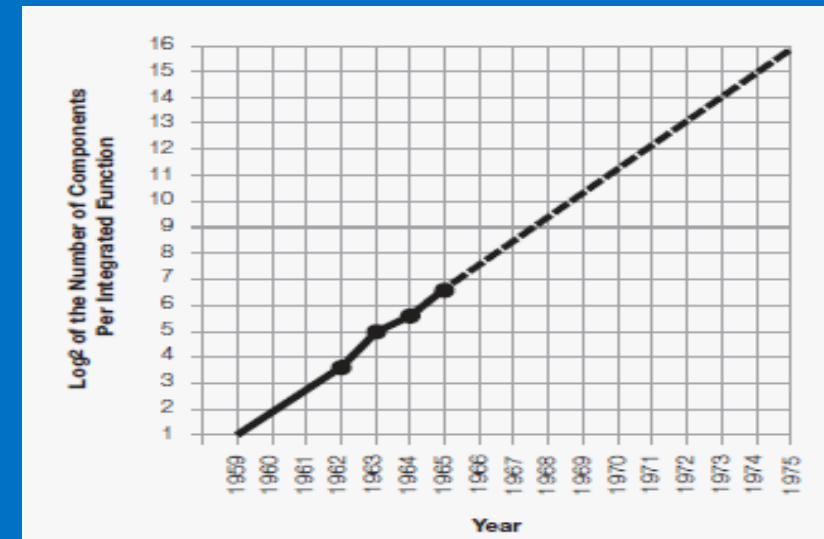
Applying the Benefits Across the Product Portfolio



Moore's Law – It's All About Economics

“Reduced cost is one of the big attractions of integrated electronics, and the cost advantage continues to increase as the technology evolves toward the production of larger and larger circuit functions on a single semiconductor substrate.”

Electronics, Volume 38, Number 8, April 19, 1965

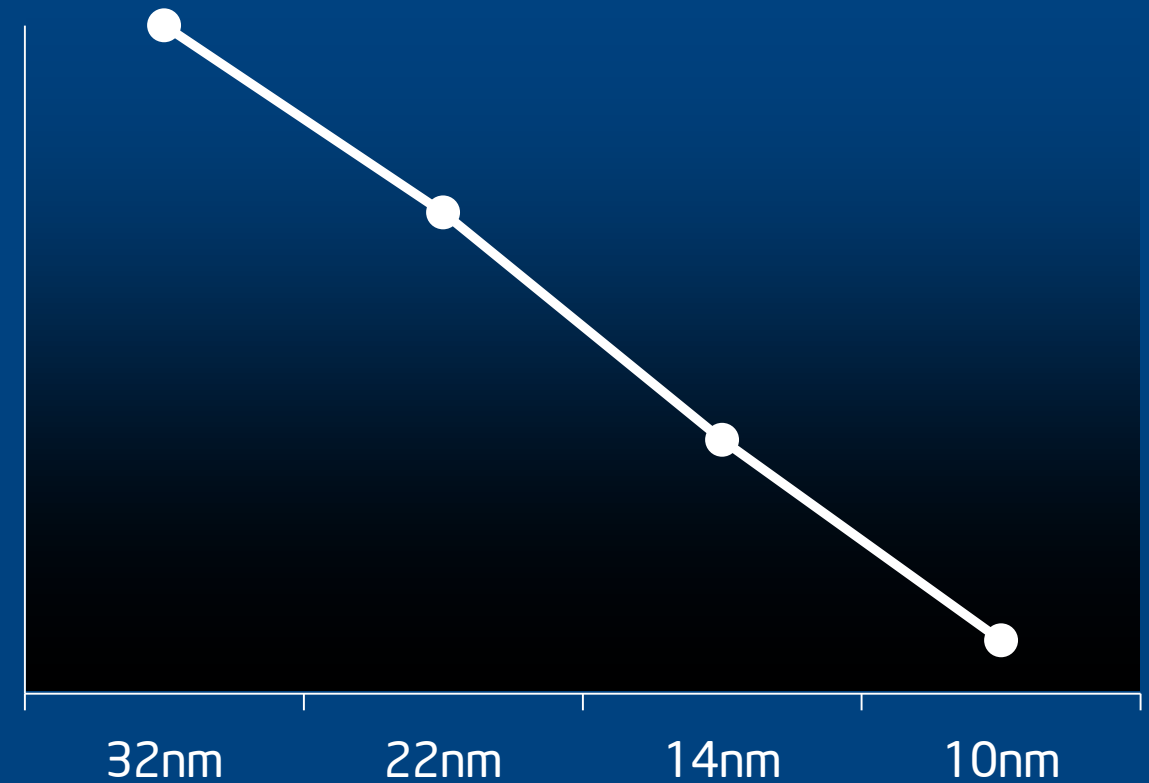


Competitors Projecting No Chip Area Scaling

Competitor Area Scaling
(normalized to 28nm)



Intel Area Scaling
(normalized to 32nm)

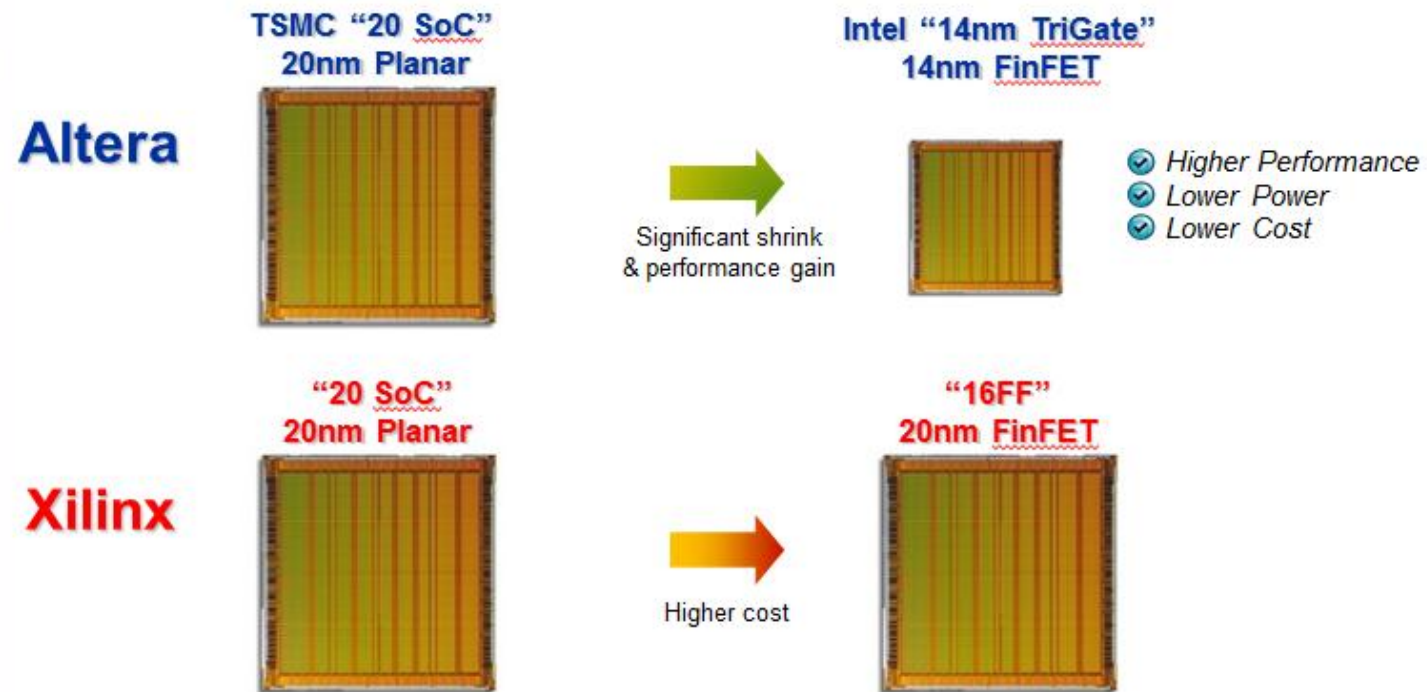


Competitor area scaling source: ARM Tech Con 2012, TSMC Keynote. Oct. 30, 2012 * Forecast

Intel is Continuing to Scale While Others are Pausing to do FinFETs

Our Customers See the Same Indicators

Altera vs. Xilinx Roadmap Comparison



Altera to capture high end FPGA market

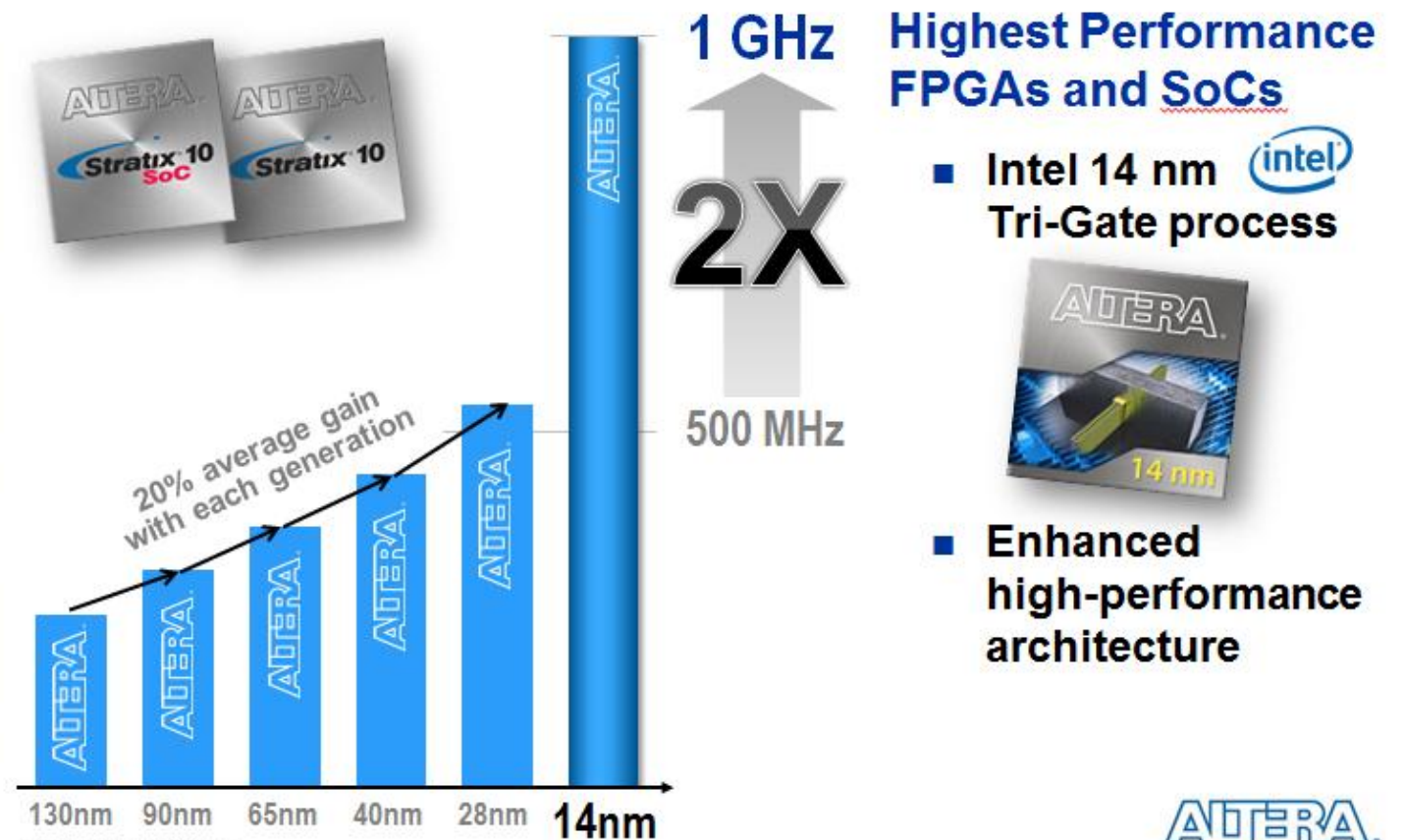
Note: Altera relative die size estimates for equivalent capacity devices

© 2013 Altera Corporation—Public

ALTERA
MEASURABLE ADVANTAGE™

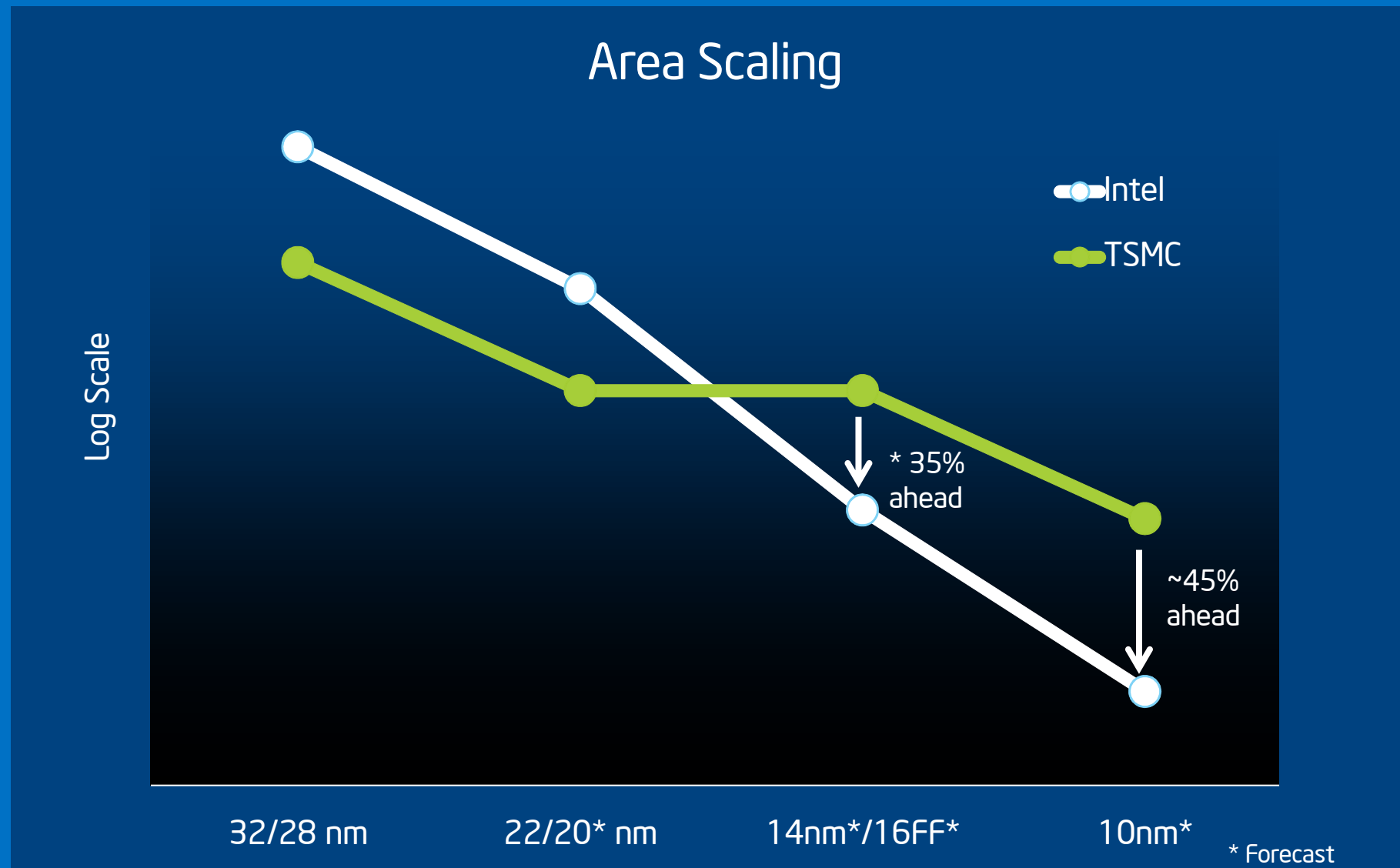
1

Stratix 10 Delivering the Unimaginable



2

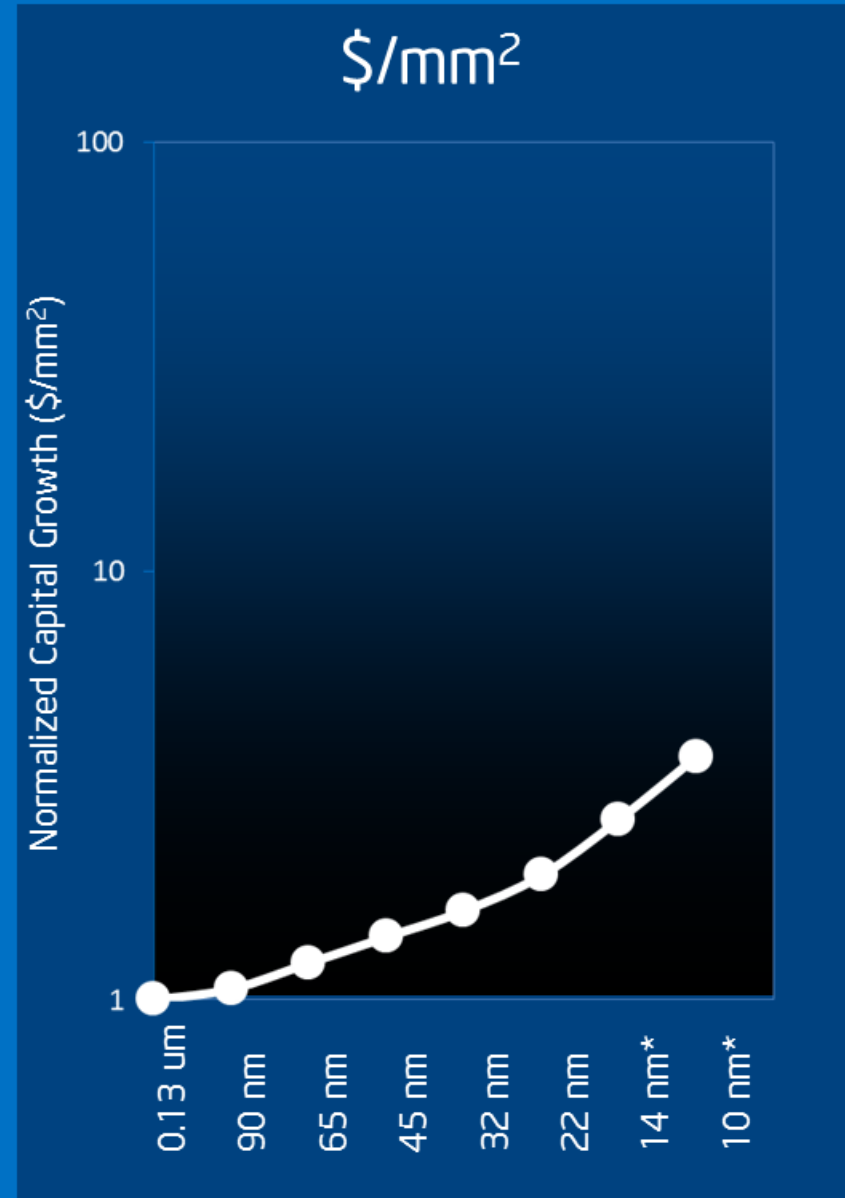
Intel Is Committed to Press Ahead on Density



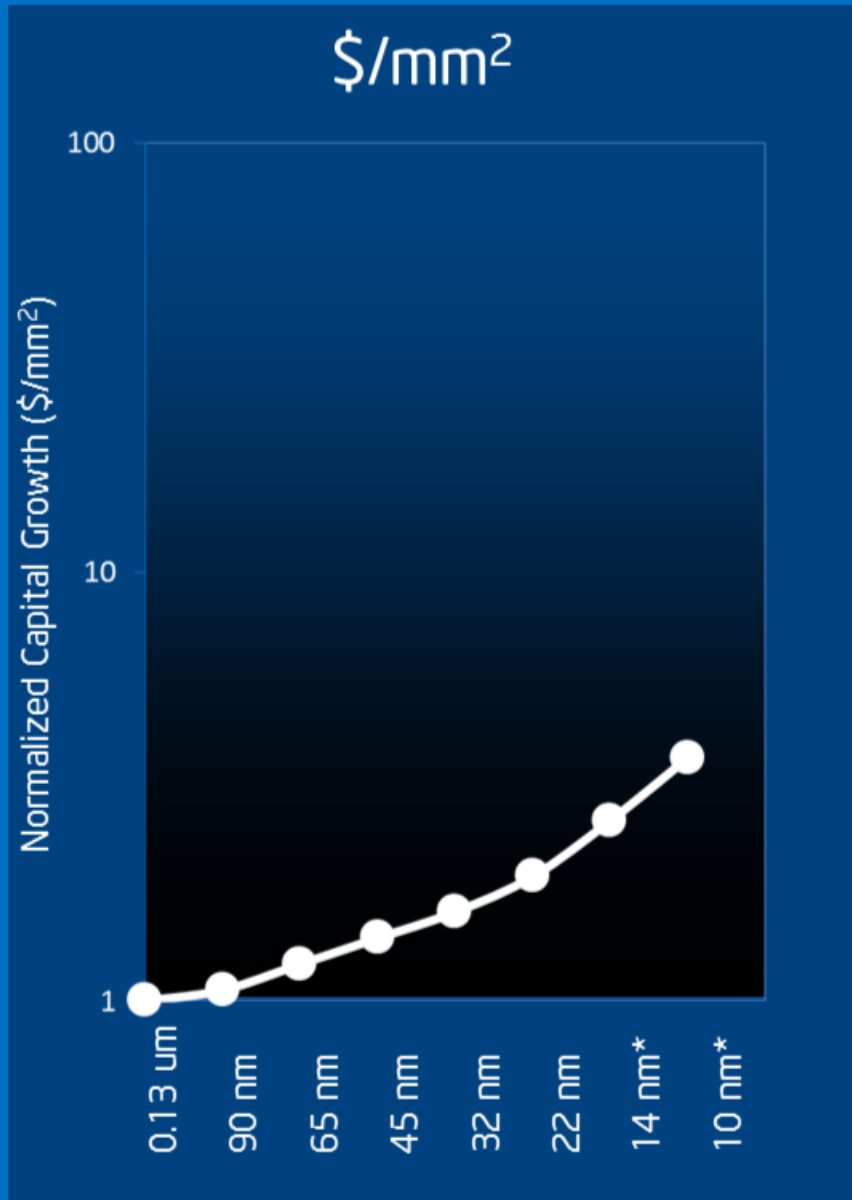
Sources: TSMC keynote, ARM Tech Con 2012, Oct. 30, 2012. Intel data Alignment based on internal assessment

Enables a "Transistor Like" Lead in Density

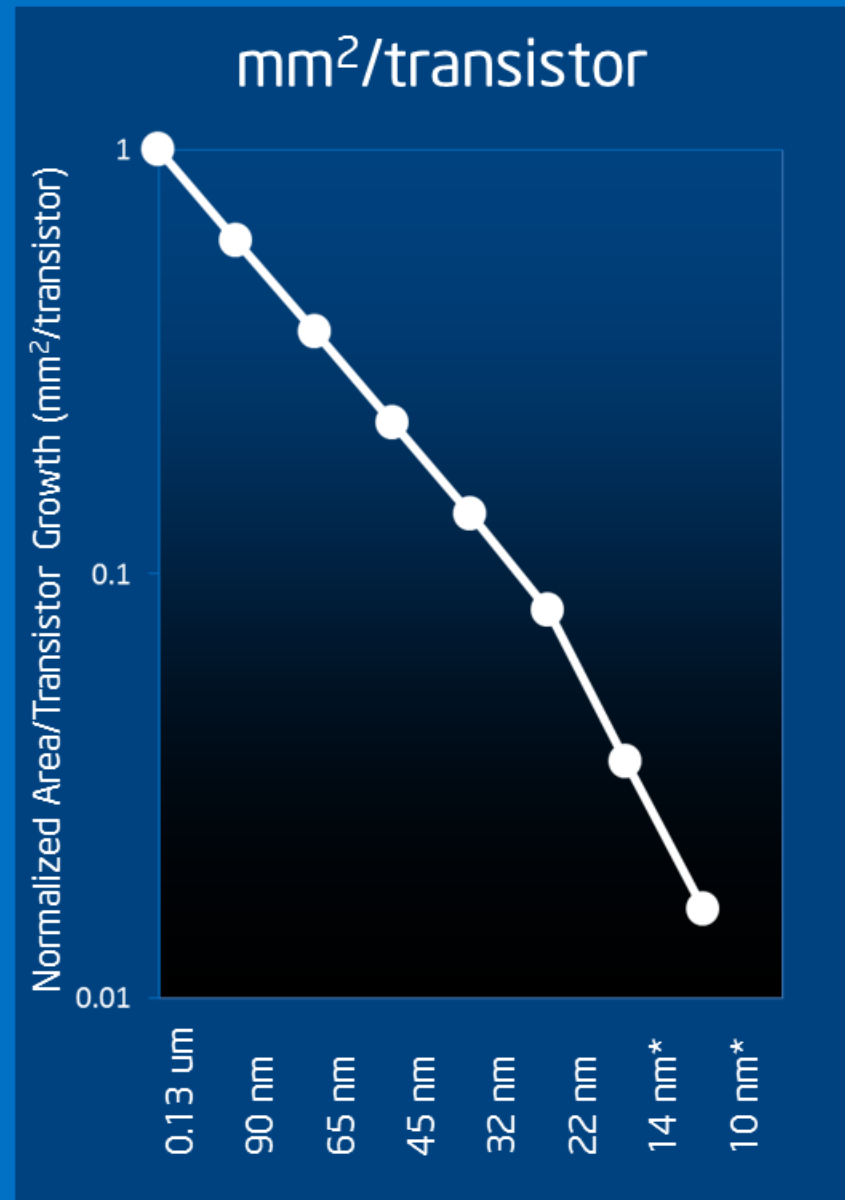
Density Improvements Offset Wafer Cost Trends



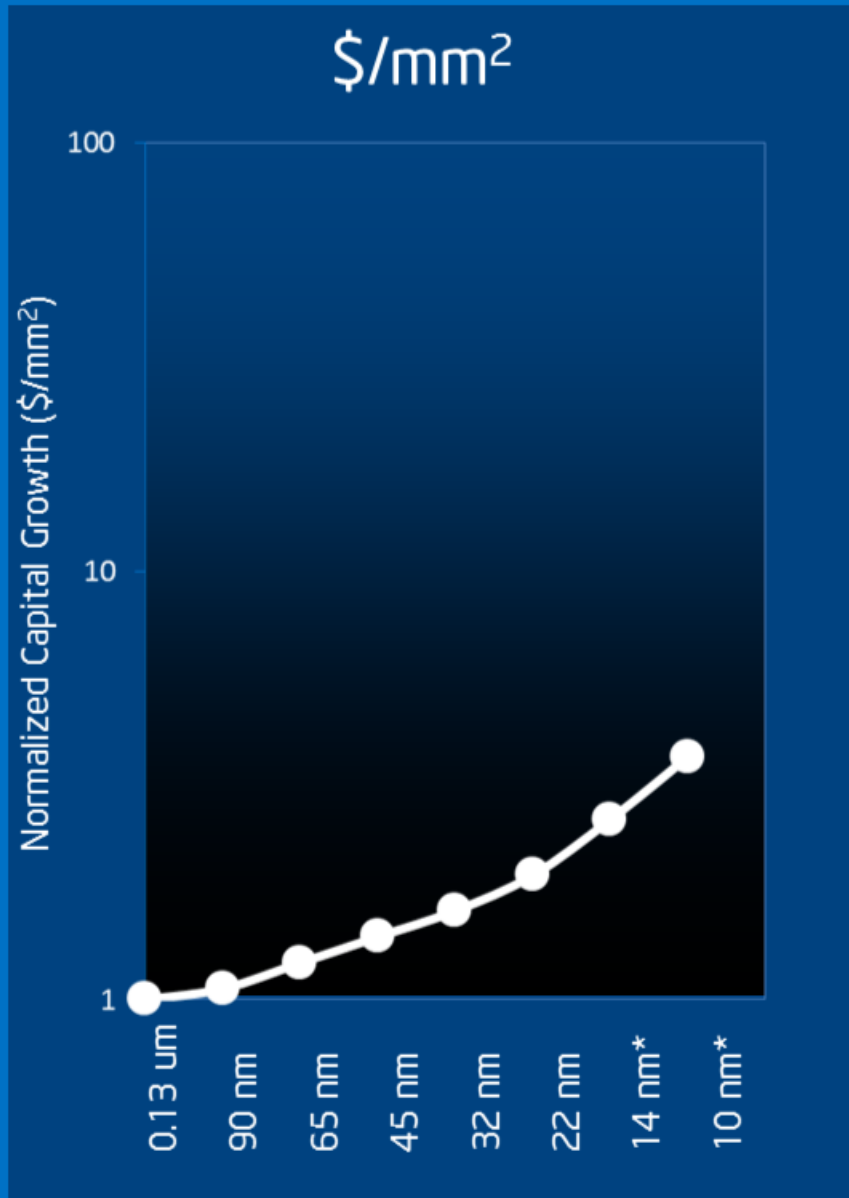
Density Improvements Offset Wafer Cost Trends



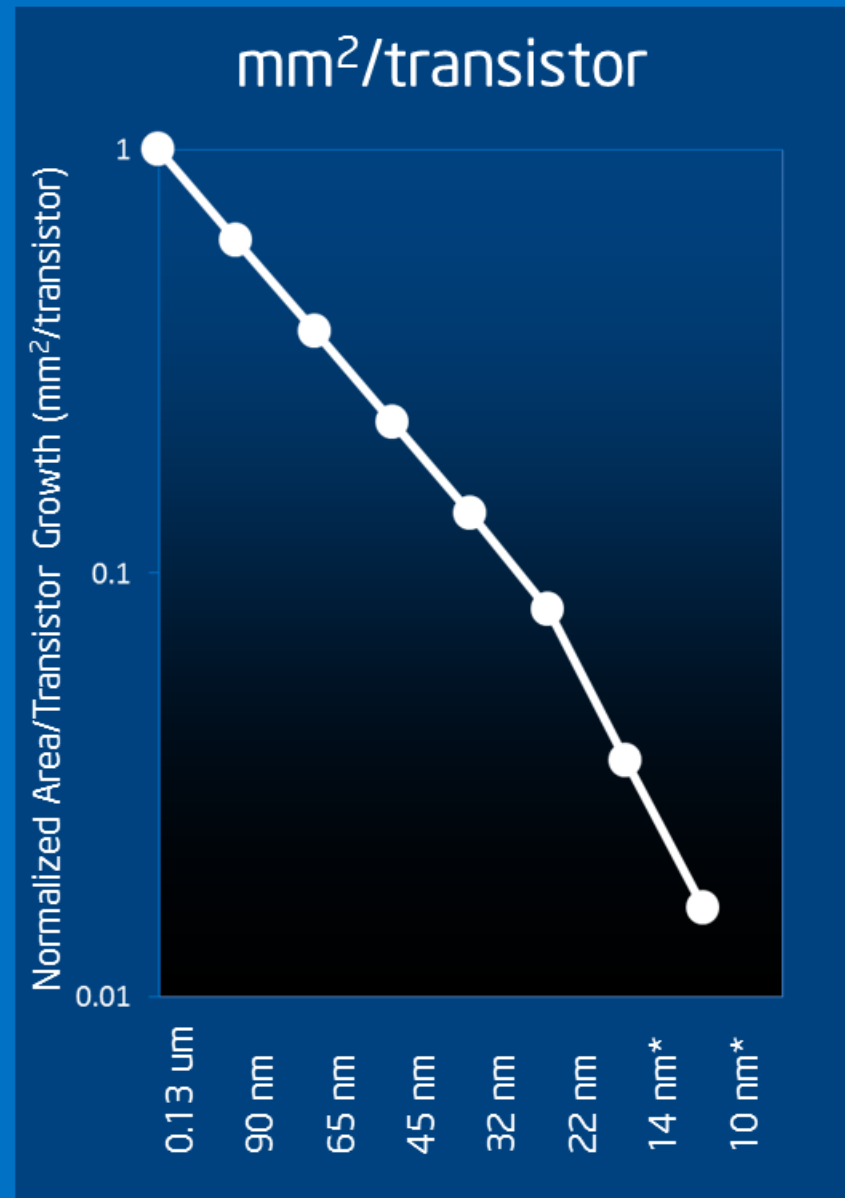
X



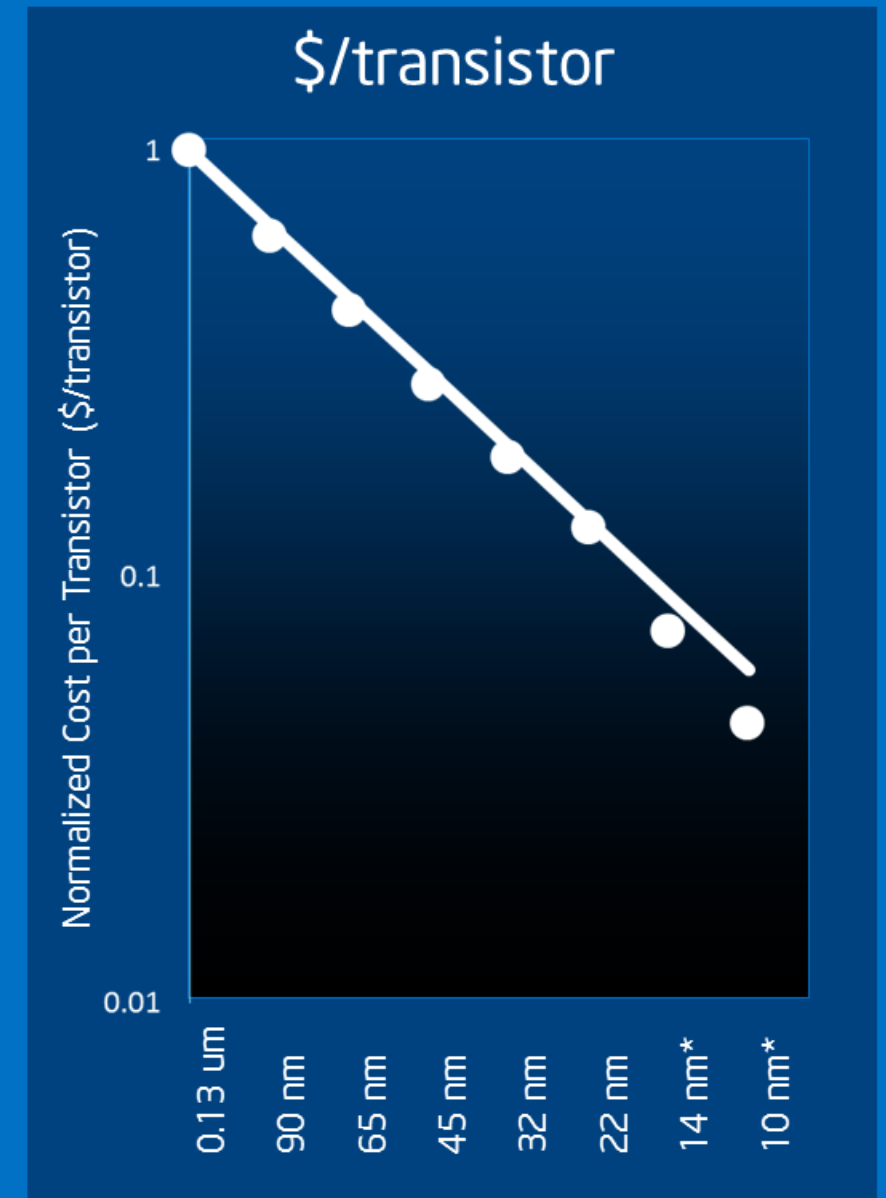
Density Improvements Offset Wafer Cost Trends



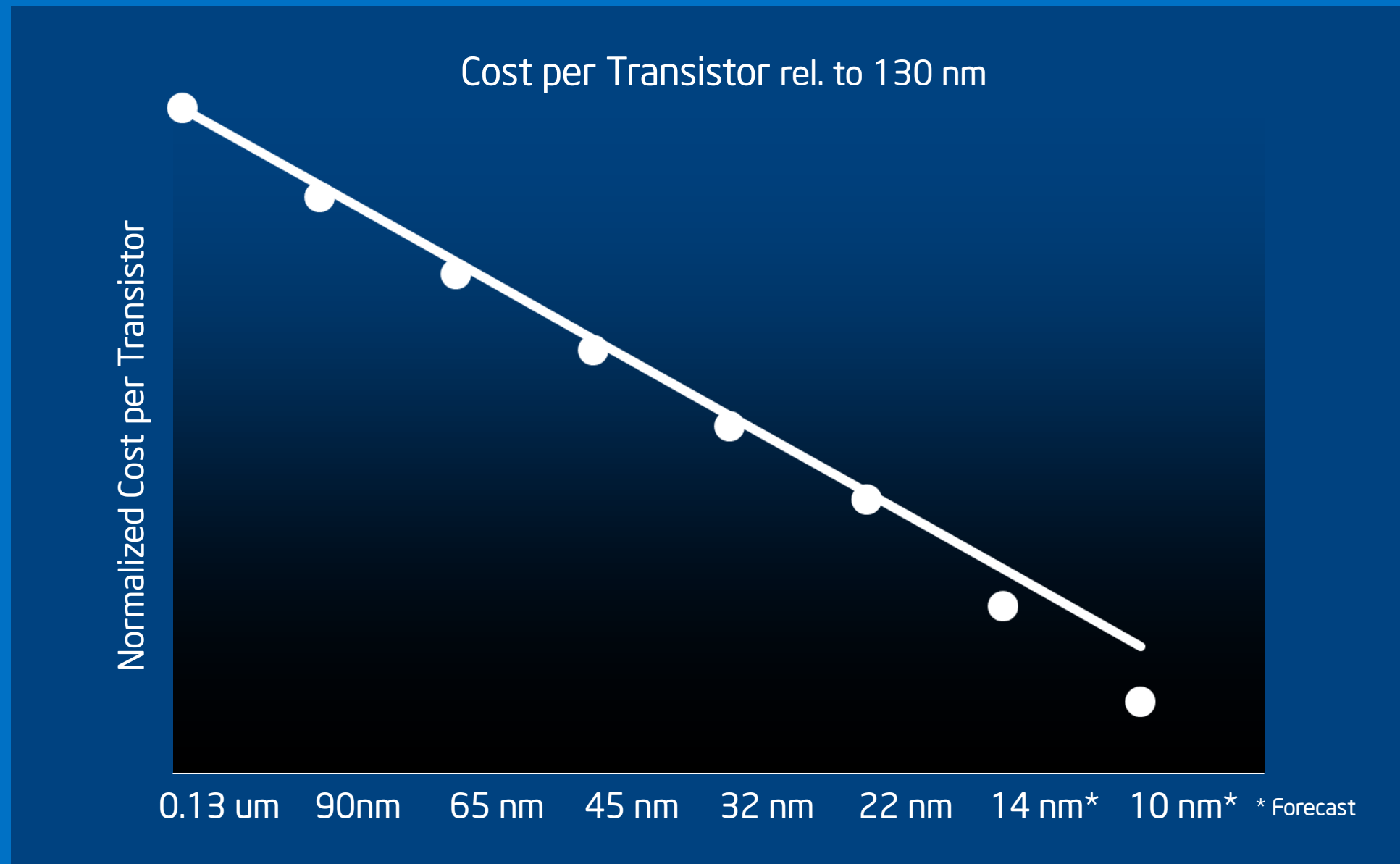
\times



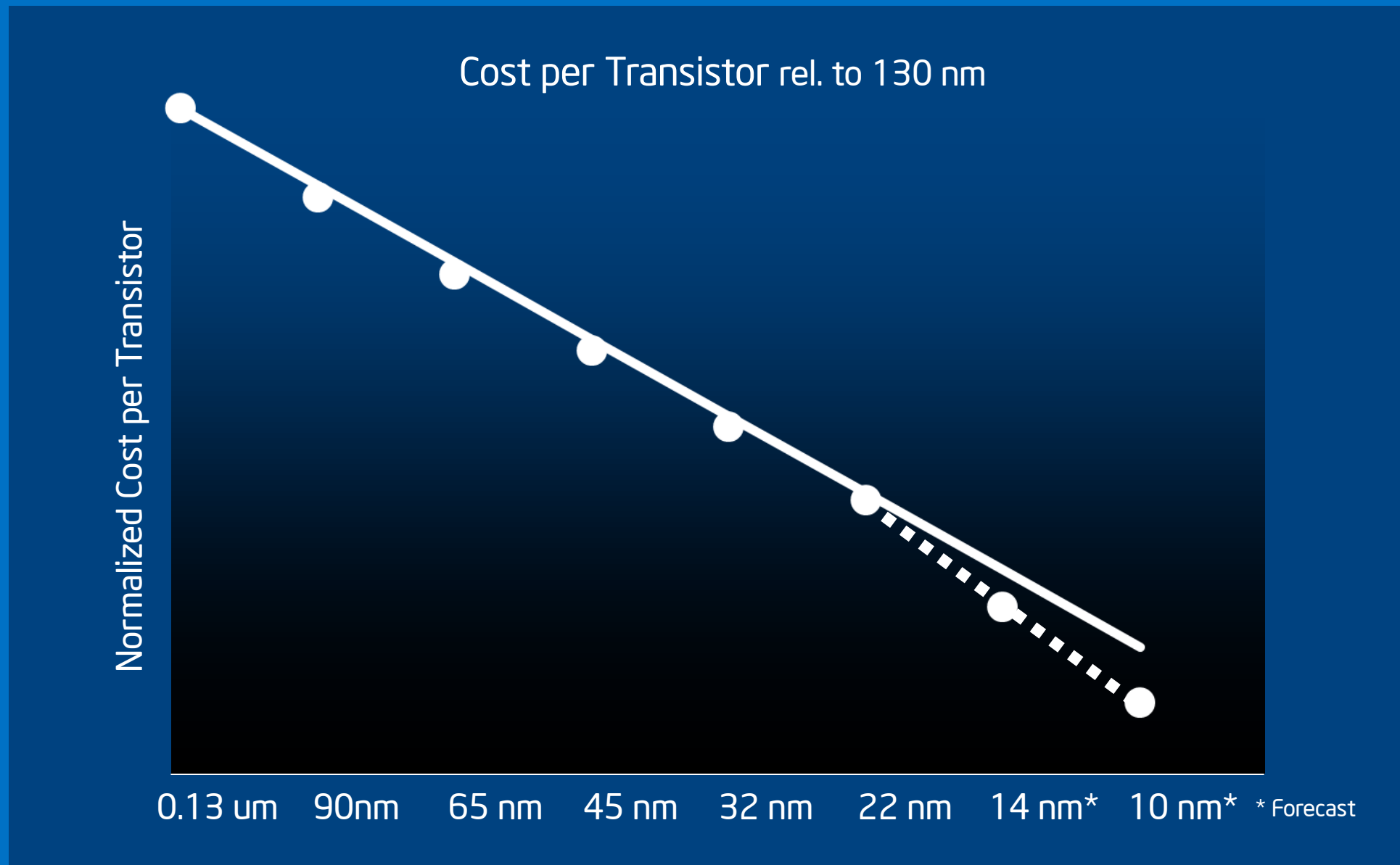
$=$



Density Scaling Continues Cost Improvement



Density Scaling ~~Continues~~ Cost Improvement Accelerates

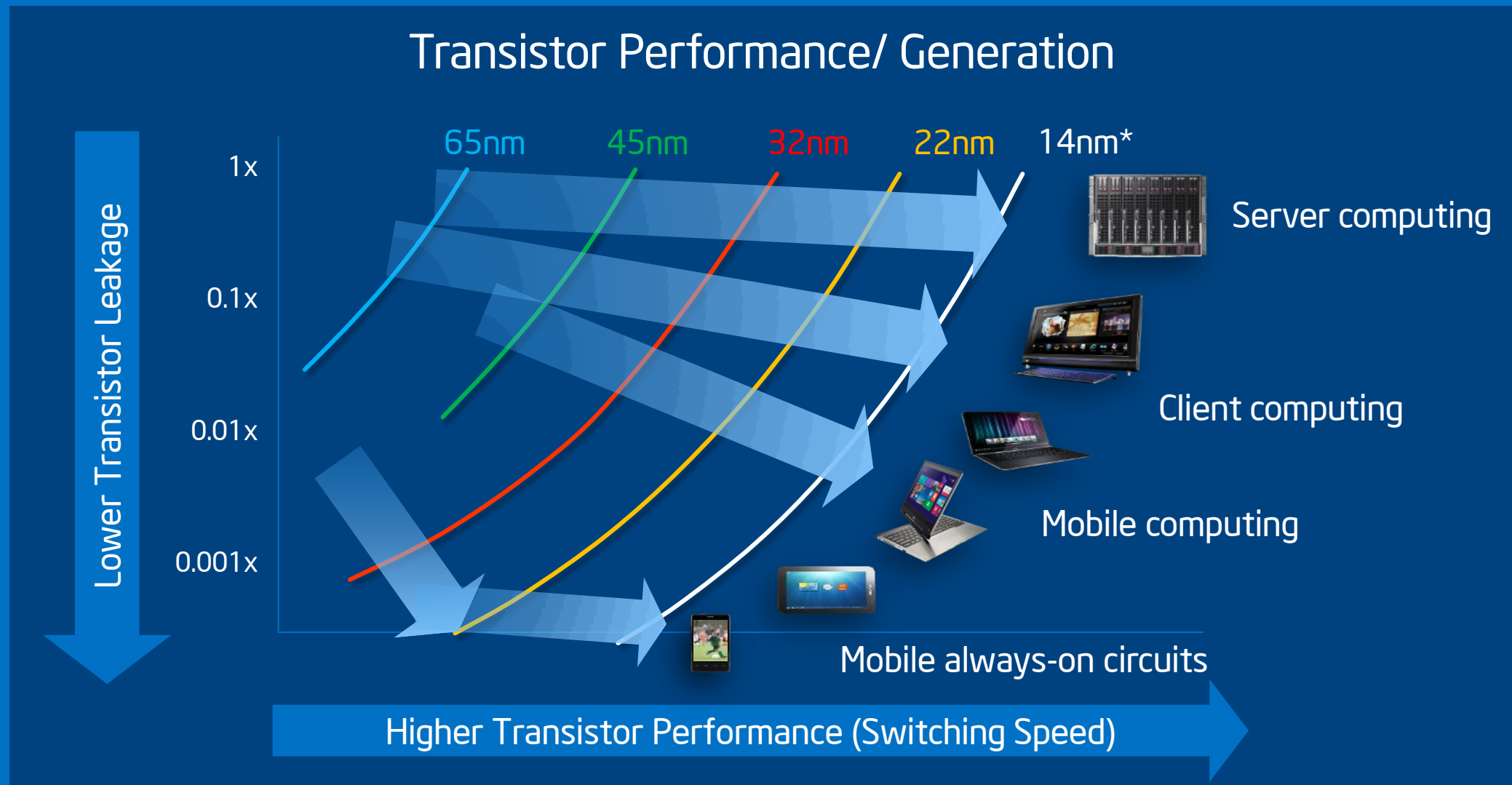


Fundamentals of Moore's Law

Reducing Cost in a Capital Intensive Environment

Applying the Benefits Across the Product Portfolio

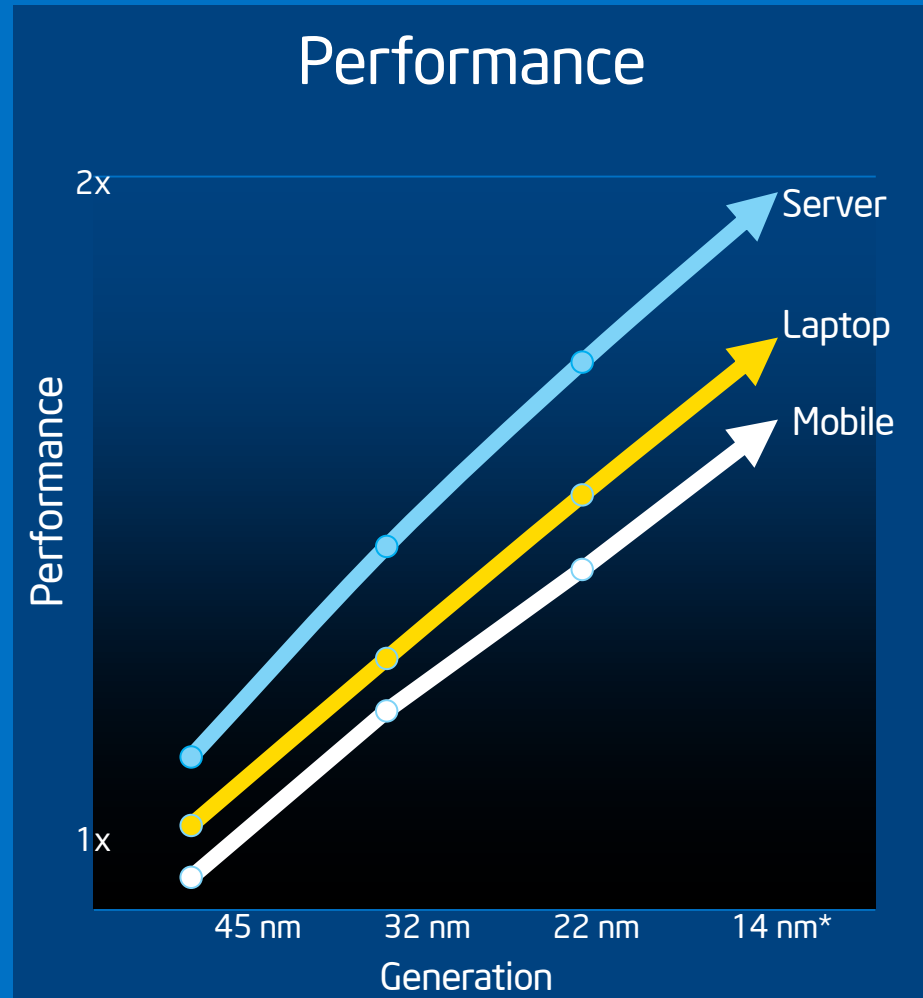
The Value of Better Transistors



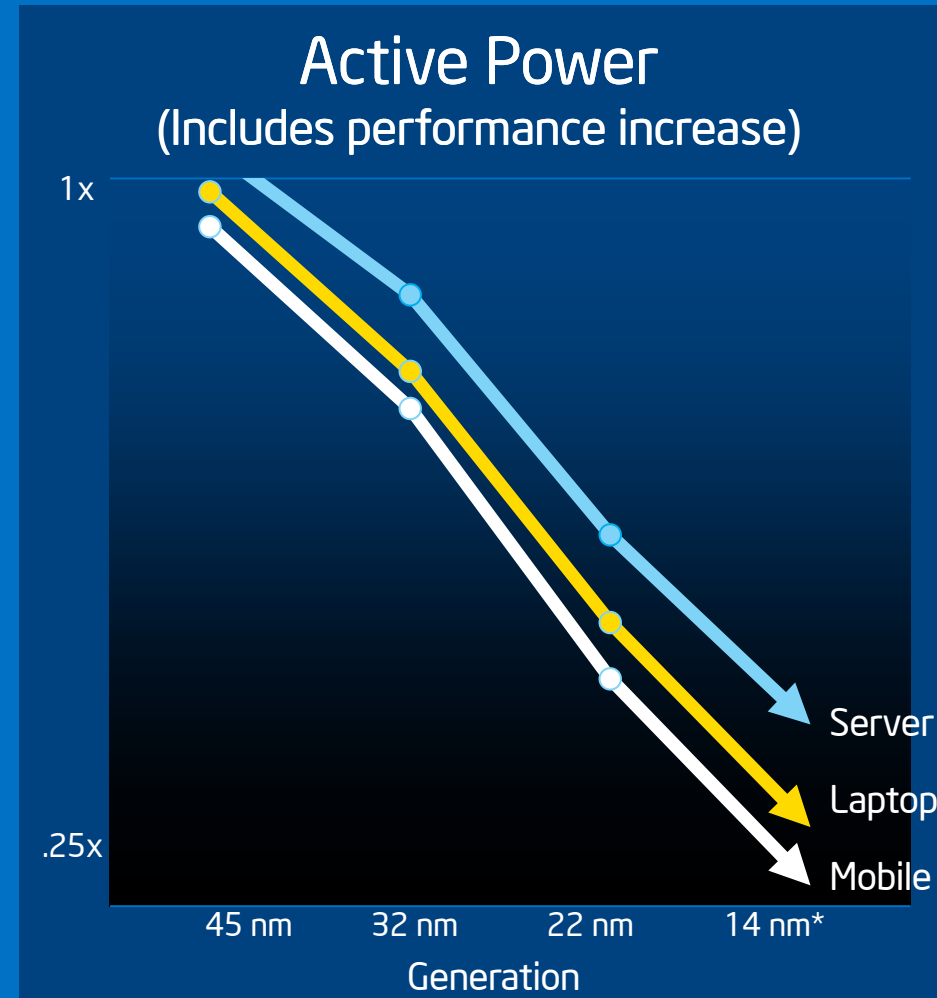
14nm: Continuing the Historical Gains

* Forecast
Source: Intel

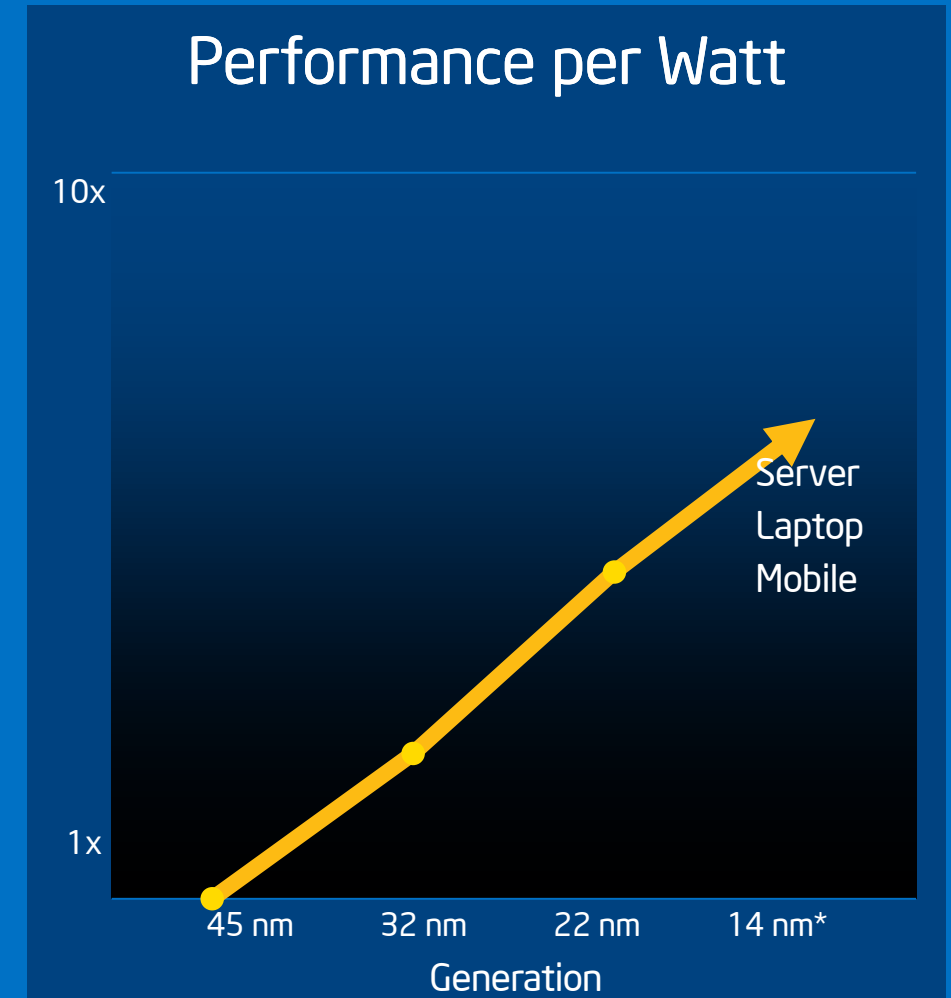
Different Improvement Focus for Different Segments



*Performance Improved
for All Product Families*



*Active Power Reduced
for All Product Families*

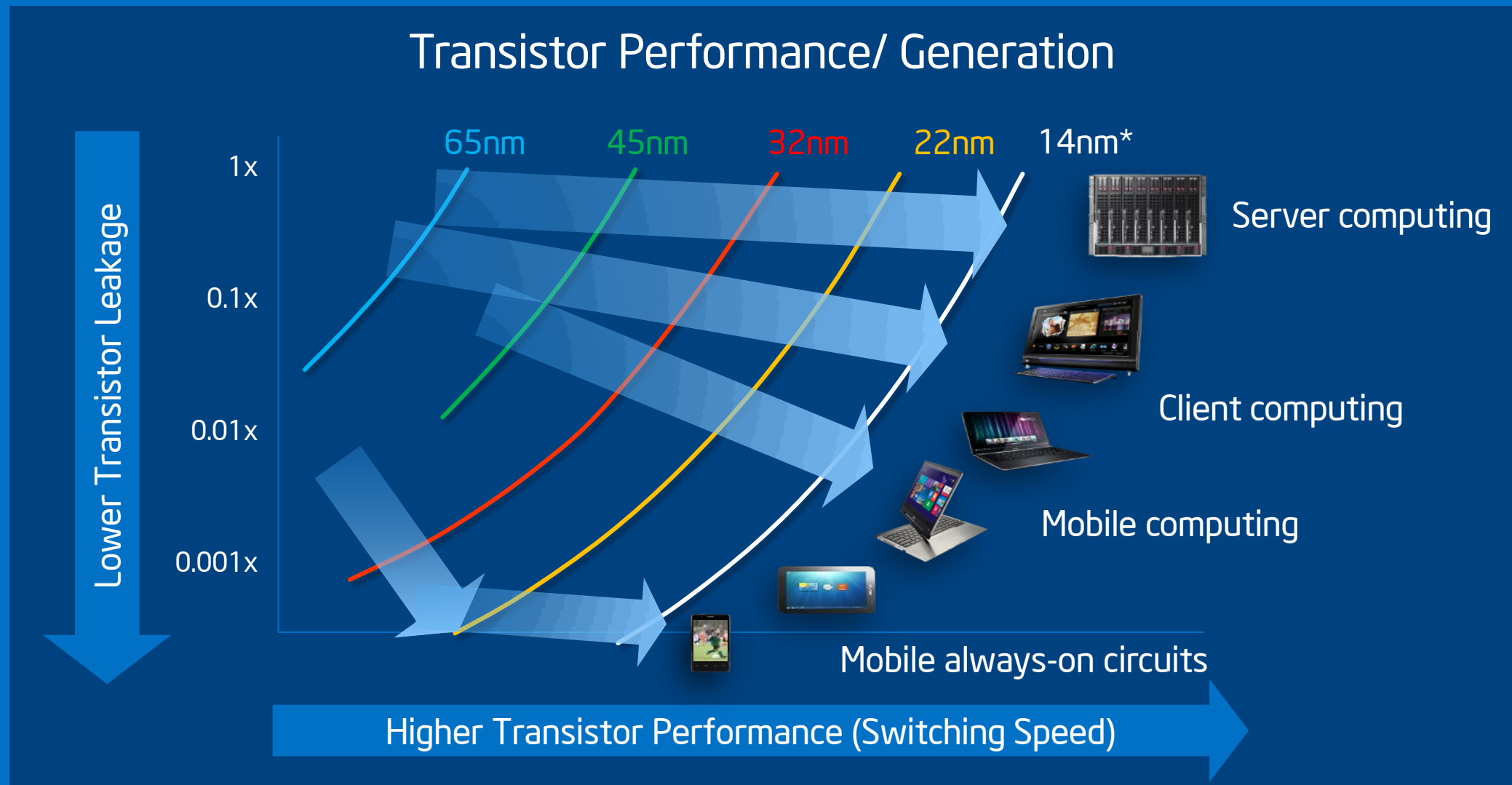


*Performance per Watt Improves
>1.6x per Generation*

Performance per Watt is the Critical enabler for all

* Forecast
Source: Intel

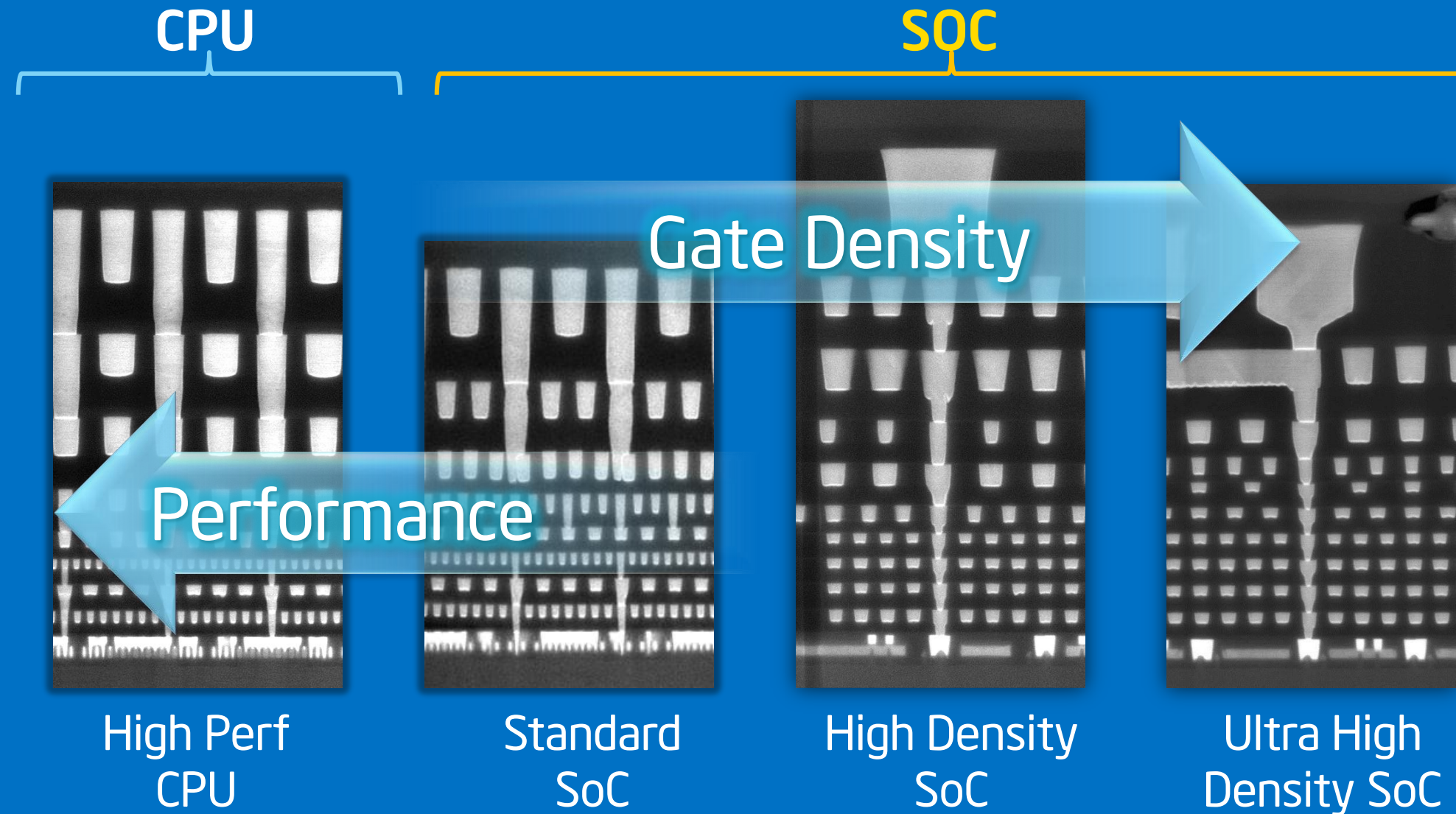
The Value of Better Transistors



The Same Fundamental Improvement Benefits a Wide Range of Products

* Forecast
Source: Intel

Interconnects Options Enable Product Optimization

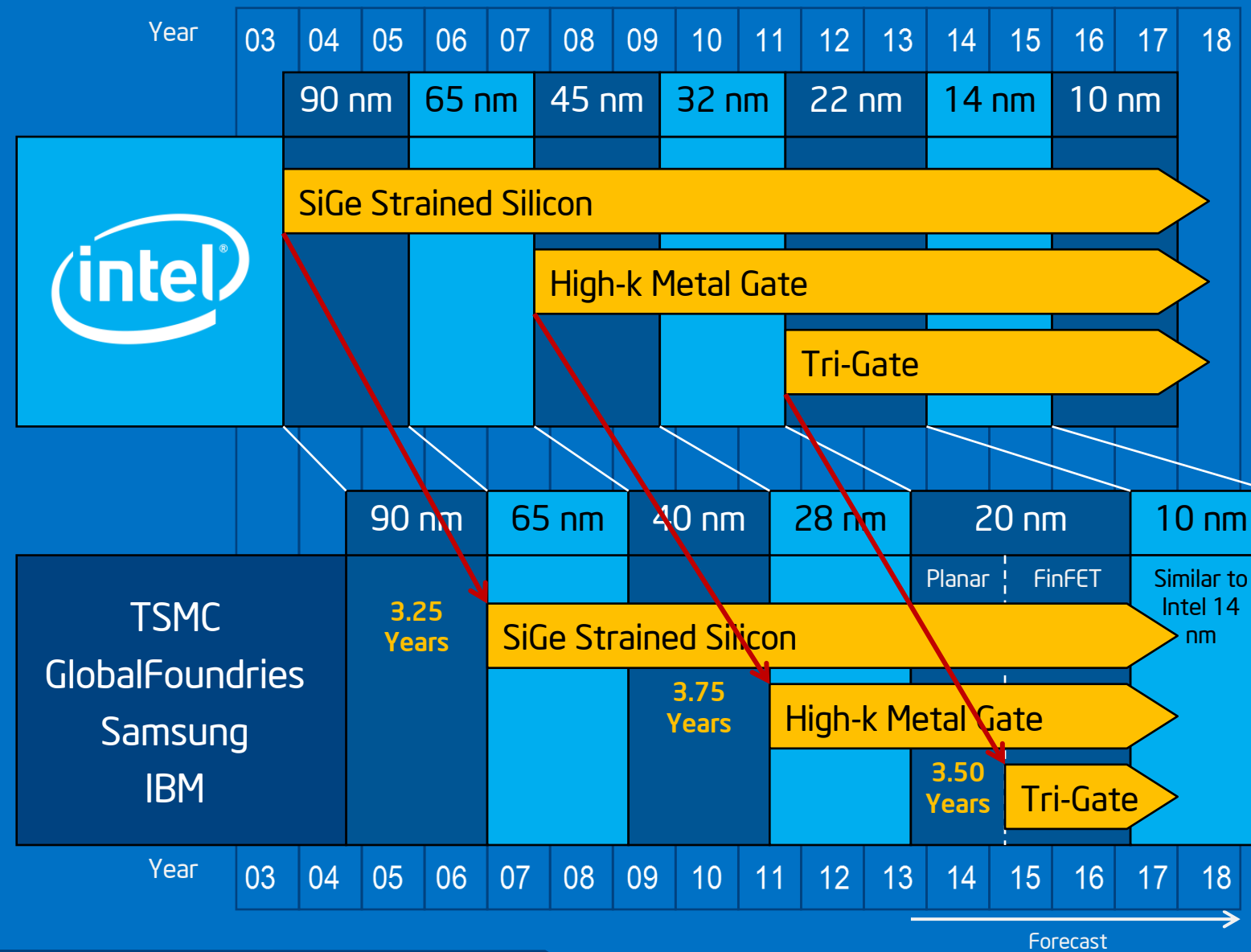


CPU Interconnects Focused on Performance
SoC Interconnects Focused on Density

Expanding the Breadth of Technology Options

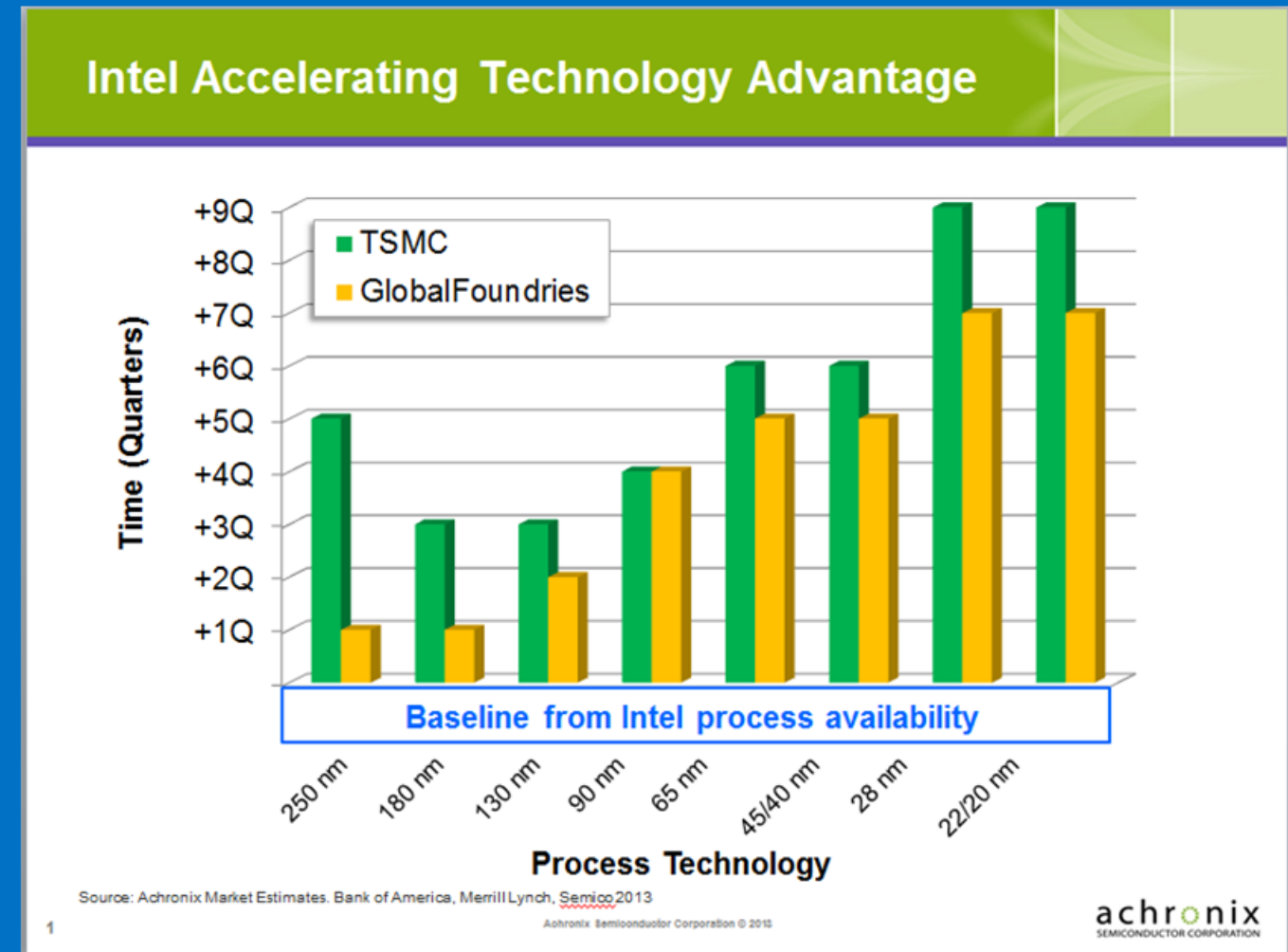
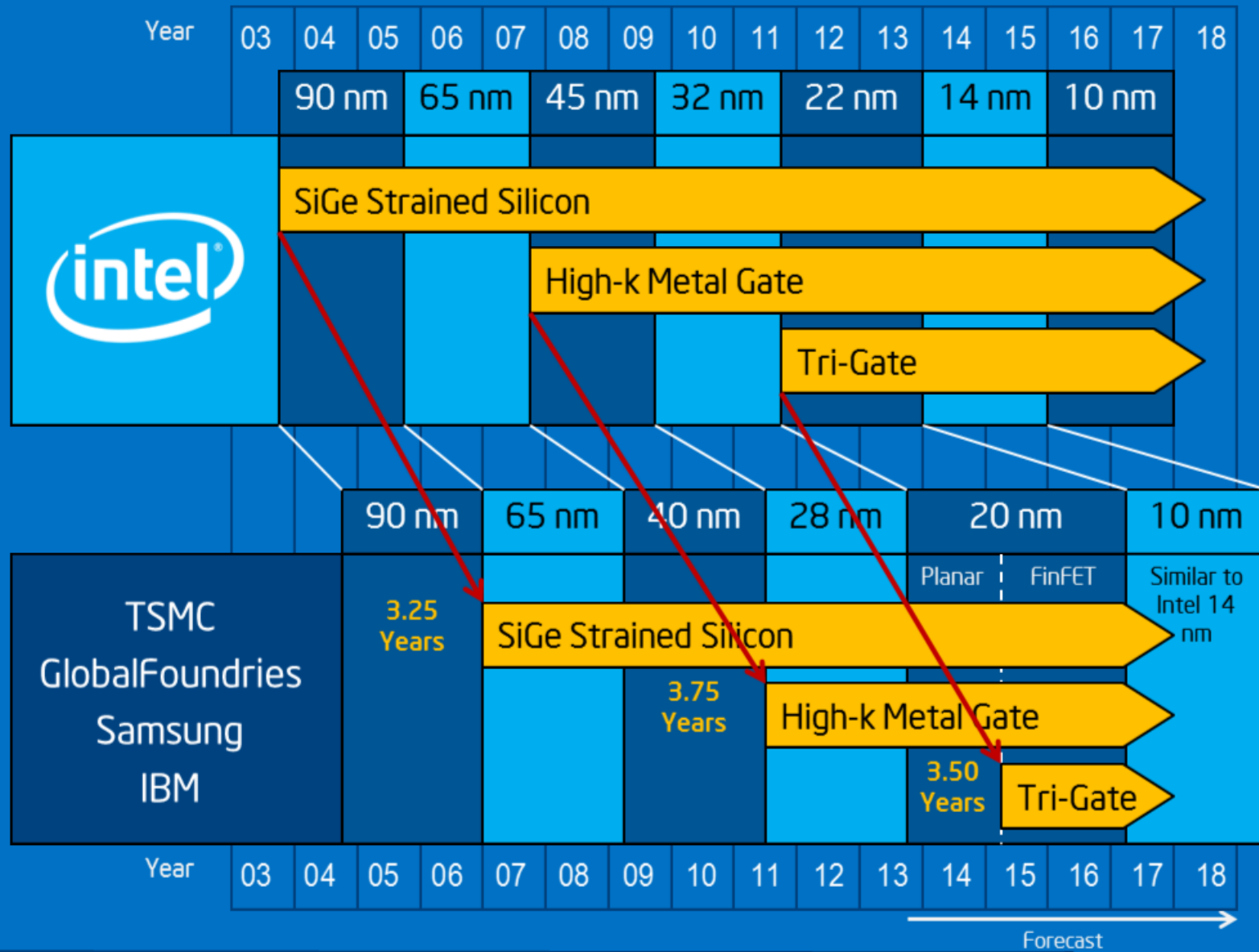
Intel										Intel Custom Foundry			
Features	Options	Client/ Server	Chipsets	Tablets	Embedded DRAM	Wireless Products	Smart Phones	Entry Mobile	FPGA/ ASIC				
Logic Transistor	HP - High Perf.	●		●	●	●	●	●	●				
	SP - Std. Perf/Pwr		●			●	●	●	●				
	LP - Low Power		●			●	●	●					
I/O Transistor	1.2V	●				●	●		●				
	1.8V			●	●	●	●	●	●				
	3.3V		●										
Interconnect	RC Performance	●		●			●		●				
	High Density		●										
	Low Cost					●		●					
	COB				●								
Embedded Memory	e-SRAM - High Performance	●		●				●	●				
	e-SRAM - Low Voltage	●	●	●				●					
	e-SRAM - Low Power		●			●	●		●				
	e-SRAM - Dual Port								●				
	e-PROM/OTP	●	●	●	●	●	●	●	●				
	e-DRAM				●								
Basic Analog/ Passives	Resistor - Linear	●	●	●	●	●	●	●	●				
	Capacitor - MOS, MFC	●	●	●	●	●	●	●	●				
	Capacitor - MIMCAP	●		●		●	●		●				
	Inductor - Standard	●		●		●		●	●				
Library	High Performance	●							●				
	General Purpose	●	●	●	●		●	●	●				
	High Density		●	●		●	●	●	●				
Adv. Mixed Signals/ RF	Transistor - PA					●							
	Resistor - Precision		●	●		●	●	●	●				
	Capacitor - Linear					●							
	Inductor - High Q					●							
	Deep Nwell/Triple Well					●							
	High Res Substrate					●							

Intel Technology Leadership



Intel Has ~3.5 Year Lead In Introducing Revolutionary Transistor Technologies

Intel Technology Leadership



Source: Achronix, Leading the Industry, Achronix Now Shipping Intel 22nm FPGAs, November 7th, 2013

Intel Has ~3.5 Year Lead In Introducing Revolutionary Transistor Technologies

Summary

Intel Continues to Deliver the Benefits of Moore's Law

True Cost Reduction Remains Possible in a Capital Intensive Environment

The Benefits of Technology Apply Across the Product Portfolio



Risk Factors

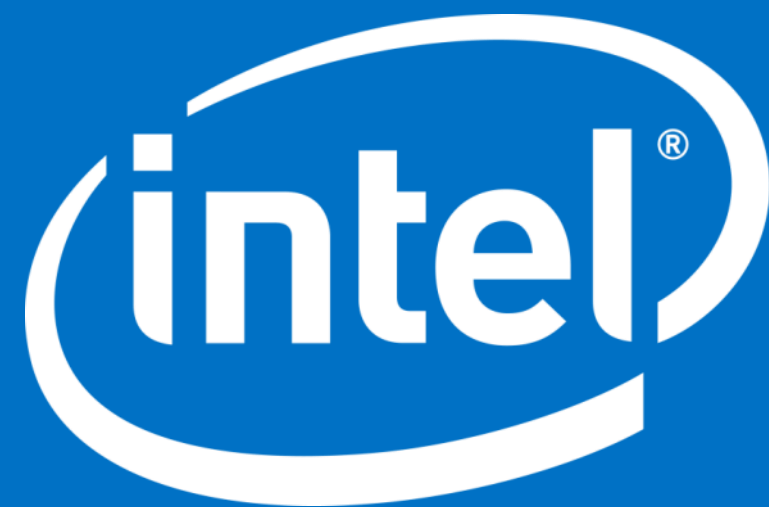
The above statements and any others in this document that refer to plans and expectations for the fourth quarter, the year and the future are forward-looking statements that involve a number of risks and uncertainties. Words such as “anticipates,” “expects,” “intends,” “plans,” “believes,” “seeks,” “estimates,” “may,” “will,” “should” and their variations identify forward-looking statements. Statements that refer to or are based on projections, uncertain events or assumptions also identify forward-looking statements. Many factors could affect Intel’s actual results, and variances from Intel’s current expectations regarding such factors could cause actual results to differ materially from those expressed in these forward-looking statements. Intel presently considers the following to be the important factors that could cause actual results to differ materially from the company’s expectations. Demand could be different from Intel’s expectations due to factors including changes in business and economic conditions; customer acceptance of Intel’s and competitors’ products; supply constraints and other disruptions affecting customers; changes in customer order patterns including order cancellations; and changes in the level of inventory at customers. Uncertainty in global economic and financial conditions poses a risk that consumers and businesses may defer purchases in response to negative financial events, which could negatively affect product demand and other related matters. Intel’s results, including revenue, gross margin, expenses and interest and other, would likely be adversely affected in the event of widespread financial and business disruption on account of a default by the U.S. on U.S. government obligations and/or a prolonged failure to maintain significant U.S. government operations. Intel operates in intensely competitive industries that are characterized by a high percentage of costs that are fixed or difficult to reduce in the short term and product demand that is highly variable and difficult to forecast. Revenue and the gross margin percentage are affected by the timing of Intel product introductions and the demand for and market acceptance of Intel’s products; actions taken by Intel’s competitors, including product offerings and introductions, marketing programs and pricing pressures and Intel’s response to such actions; and Intel’s ability to respond quickly to technological developments and to incorporate new features into its products. The gross margin percentage could vary significantly from expectations based on capacity utilization; variations in inventory valuation, including variations related to the timing of qualifying products for sale; changes in revenue levels; segment product mix; the timing and execution of the manufacturing ramp and associated costs; start-up costs; excess or obsolete inventory; changes in unit costs; defects or disruptions in the supply of materials or resources; product manufacturing quality/yields; and impairments of long-lived assets, including manufacturing, assembly/test and intangible assets. The tax rate expectation is based on current tax law and current expected income. The tax rate may be affected by the jurisdictions in which profits are determined to be earned and taxed; changes in the estimates of credits, benefits and deductions; the resolution of issues arising from tax audits with various tax authorities, including payment of interest and penalties; and the ability to realize deferred tax assets. Gains or losses from equity securities and interest and other could vary from expectations depending on gains or losses on the sale, exchange, change in the fair value or impairments of debt and equity investments; interest rates; cash balances; and changes in fair value of derivative instruments. Intel’s results could be affected by adverse economic, social, political and physical/infrastructure conditions in countries where Intel, its customers or its suppliers operate, including military conflict and other security risks, natural disasters, infrastructure disruptions, health concerns and fluctuations in currency exchange rates. Expenses, particularly certain marketing and compensation expenses, as well as restructuring and asset impairment charges, vary depending on the level of demand for Intel’s products and the level of revenue and profits. Intel’s results could be affected by the timing of closing of acquisitions and divestitures. Intel’s results could be affected by adverse effects associated with product defects and errata (deviations from published specifications), and by litigation or regulatory matters involving intellectual property, stockholder, consumer, antitrust, disclosure and other issues, such as the litigation and regulatory matters described in Intel’s SEC reports. An unfavorable ruling could include monetary damages or an injunction prohibiting Intel from manufacturing or selling one or more products, precluding particular business practices, impacting Intel’s ability to design its products, or requiring other remedies such as compulsory licensing of intellectual property. A detailed discussion of these and other factors that could affect Intel’s results is included in Intel’s SEC filings, including the company’s most recent Form 10-Q, Form 10-K and earnings release.

Legal Disclaimers

- Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.
- Intel does not control or audit the design or implementation of third party benchmark data or Web sites referenced in this document. Intel encourages all of its customers to visit the referenced Web sites or others where similar performance benchmark data are reported and confirm whether the referenced benchmark data are accurate and reflect performance of systems available for purchase.
- Relative performance for each benchmark is calculated by taking the actual benchmark result for the first platform tested and assigning it a value of 1.0 as a baseline. Relative performance for the remaining platforms tested was calculated by dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms and assigning them a relative performance number that correlates with the performance improvements reported.
- SPEC, SPECint, SPECfp, SPECrate, SPECpower, and SPECjbb are trademarks of the Standard Performance Evaluation Corporation. See <http://www.spec.org> for more information.
- Intel® Hyper-Threading Technology (Intel® HT Technology): Available on select Intel® Core™ processors. Requires an Intel® HT Technology-enabled system. Consult your PC manufacturer. Performance will vary depending on the specific hardware and software used. For more information including details on which processors support HT Technology, visit <http://www.intel.com/info/hyperthreading>.
- Intel® Turbo Boost Technology: Requires a system with Intel® Turbo Boost Technology. Intel Turbo Boost Technology and Intel Turbo Boost Technology 2.0 are only available on select Intel® processors. Consult your system manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit <http://www.intel.com/go/turbo>
- Intel® products are not intended for use in medical, life-saving, life-sustaining, critical control, or safety systems, or in nuclear facility applications. All dates and products specified are for planning purposes only and are subject to change without notice.
- Intel product plans in this presentation do not constitute Intel plan of record product roadmaps. Please contact your Intel representative to obtain Intel's current plan of record product roadmaps.
- Copyright © 2013 Intel Corporation. All rights reserved. Intel, the Intel logo, Xeon, Atom and Intel Core are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
- All dates and products specified are for planning purposes only and are subject to change without notice
- *Other names and brands may be claimed as the property of others.

Legal Disclaimers

- Information In This Document Is Provided In Connection With Intel Products. No License, Express Or Implied, By Estoppel Or Otherwise, To Any Intellectual Property Rights Is Granted By This Document. Except As Provided In Intel's Terms And Conditions Of Sale For Such Products, Intel Assumes No Liability Whatsoever And Intel Disclaims Any Express Or Implied Warranty, Relating To Sale And/Or Use Of Intel Products Including Liability Or Warranties Relating To Fitness For A Particular Purpose, Merchantability, Or Infringement Of Any Patent, Copyright Or Other Intellectual Property Right.
- A "Mission Critical Application" Is Any Application In Which Failure Of The Intel Product Could Result, Directly Or Indirectly, In Personal Injury Or Death. Should You Purchase Or Use Intel's Products For Any Such Mission Critical Application, You Shall Indemnify And Hold Intel And Its Subsidiaries, Subcontractors And Affiliates, And The Directors, Officers, And Employees Of Each, Harmless Against All Claims Costs, Damages, And Expenses And Reasonable Attorneys' Fees Arising Out Of, Directly Or Indirectly, Any Claim Of Product Liability, Personal Injury, Or Death Arising In Any Way Out Of Such Mission Critical Application, Whether Or Not Intel Or Its Subcontractor Was Negligent In The Design, Manufacture, Or Warning Of The Intel Product Or Any Of Its Parts.
- Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined". Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.
- The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.



Look Inside.™